Claims

Claims 1-11 (canceled)

Claim 12 (new) Method suitable for church organ flue pipes' sound synthesis which consists in synthesizing a harmonic sequence, synthesizing an aleatory sequence, and processing said sequences by means of a closed loop of linear functional blocks, characterised by the fact that:

- said harmonic sequence's synthesis is based on the generation of a first sinusoidal sequence (16) whose frequency, dependently from informations derived from musical means, is the fundamental frequency of said harmonic sequence, and on the generation of a second sinusoidal sequence (17), whose frequency is a multiple of said first sinusoidal sequence's frequency;
- said aleatory sequence's synthesis is based on the generation of a periodic impulsive deterministic sequence (RATE), whose fundamental frequency is proportional to said harmonic sequence's fundamental frequency, and on the generation of a random sequence, whose spectrum is modified according to the time progression of said periodic impulsive deterministic sequence, to obtain said aleatory sequence (NOISE), and the smaller the value of a sample of said periodic impulsive deterministic sequence is, the more said aleatory sequence's energy is concentrated in the lower frequencies;
- said closed loop of linear functional blocks (12) includes input nodes (46 and 48) to process said harmonic sequence and said aleatory sequence, and a delay line (54) to give said closed loop's impulse response a set of resonance frequencies which are independent from said harmonic sequence's and said periodic impulsive deterministic sequence's fundamental frequencies.

Claim 13 (new) Method as described in claim 12 characterized by the fact that said harmonic sequence's synthesis includes envelopes' generation (20a and 20b), to give independent wave envelopes to two sequences derived from said two sinusoidal sequences, to resemble the first

overtone frequency's time progression during the attack transient of flue pipes' sound.

Claim 14 (new) Method as described in claim 12 characterized by the fact that said harmonic sequence's synthesis includes the synthesis of an aleatory signal (RNDPITCH), whose function is the periodical modification of the wavelength of said sinusoidal sequences, being said modification made with a frequency which is proportional to said sinusoidal sequences' fundamental frequency.

Claim 15 (new) Method as described in claim 12 characterized by the fact that the difference between said aleatory sequence's two consecutive samples is limited accordingly to the values of said periodic impulsive deterministic sequence's samples.

Claim 16 (new) Method as described in claim 12 characterized by the fact that said aleatory sequence is processed by a closed cycle (NOISE BOX) comprising delay lines, being said closed cycle characterized by a time-variant loop gain.

Claim 17 (new) Method as described in claim 12 characterized by the fact that said closed loop of linear functional blocks (12) corresponds to the pipework of flue pipes, and characterized by the fact that said delay line (54) shapes said flue pipes' tone, without any interdependency with the fundamental frequency of the sequence processed by said closed loop of linear functional blocks, allowing to model pipeworks whose length is commensurable or non-commensurable with said harmonic sequence's fundamental period.

Claim 18 (new) Electronic device for the synthesis of sounds according to the method described in claim 12characterized by the fact that it comprises:

- a first section defined as "harmonic component generator" (9) that autonomously synthesizes a "main harmonic sequence" (10), which simulates the time progression of the acoustic waves injected by the air flow into the flue pipe's pipework;
- a second section defined as "aleatory component generator" (11) which generates a random sequence and a periodic impulsive

sequence (RATE) whose samples' value controls the spectrum of said random sequence, so that the most of the energy of said random sequence is concentrated in a time interval which is shorter than the fundamental period of said "main harmonic sequence" (10);

- a closed loop section defined as "linear resonator" (12) comprising a delay line (54) and linear filters, which receives as inputs the two sequences generated by said "harmonic component generator" (9) and said "aleatory component generator" (11), and produces as output a sequence (13) that represents the product of said electronic device for the synthesis of sounds.

Claim 19 (new) Electronic device for the synthesis of sounds as described in claim 18, characterized by the fact that said "harmonic component generator" (9) comprises two frequency generators which produce two periodic sequences whose fundamental frequencies have a constant ratio and whose envelopes are independent.

Claim 20 (new) Electronic device for the synthesis of sounds as described in claim 18, characterized by the fact that said "harmonic component generator" (9) comprises a generator which produces an aleatory sequence (RNDPITCH) whose samples change their random value with a oftenness proportional to the fundamental frequency of said "main harmonic sequence" (10).

Claim 21 (new) .Electronic device for the synthesis of sounds as described in claim 18, characterized by the fact that said "aleatory component generator" (11) comprises delay lines (NBDL1, NBDL2, NBDL3 and NBDL4) and a rate limiter (42) formimg a closed loop.